APPENDIX D

WEATHER EFFECTS ON ARTILLERY

Artillery in the field is heavily weather dependent. Not only must you contend with those weather effects common to all other units but you must also compensate for a number of special effects in the area of target acquisition and aiming. Listed below are weather effects for artillery operations that are not contained in the WTDA tables.

BAROMETRIC PRESSURE. Air pressure affects projectile trajectory, barofuzing, and fire control calculations.

CLOUDS AND SKY COVER. Low ceilings affect target acquisition systems and terminally guided munitions. Low overcast clouds will limit the effectiveness of aerial illumination devices.

DENSITY. The thickness of the atmosphere (heavy air) affects fire control. The greater (heavier) the density, the shorter the range.

HUMIDITY PROFILE. This scale is used to compute virtual temperatures for ballistic firing data.

ILLUMINATION. The best use of most NVD require about a quarter (23 percent) of the moon, 30 degrees above the horizon, scattered clouds, and the sun more than 5 degrees below the horizon. Additional weather products dealing with the use of E-O devices are available from your SWO.

PRESSURE PROFILE. Barometric pressure profiles are essential in both baroarming and barofuzing. They are required for calculating densities for ballistic firing data.

REFRACTIVE INDEX. This index affects radar, laser, and infrared distance measurements.

SURFACE WINDS. Trajectory data and first round hit capability are degraded by high crosswinds. Winds affect the accuracy of rocket fire and Firefinder radar trajectory computations.

SURFACE TEMPERATURE. Frozen ground increases the time a crew has to stabilize their weapon. Extreme cold affects gun accuracy and fuse functioning. High temperature

affects stability of ammunition such as white phosphorus (WP). It also reduces rate of fire greatly because of crew heat fatigue.

TEMPERATURE PROFILE. This is another condition that affects calculations of ballistic artillery firing. The profile is used to compute virtual temperatures for artillery firing. Extreme cold affects gun accuracy and fuse functioning.

THUNDERSTORMS AND LIGHTNING. Electrical storms restrict the use of some munitions and fuse types.

VISIBILITY. This affects visual target acquisition, fire adjustment, and E-O target designation. Reduced visibility affects the placement of forward observers (FO) and fire support teams.

WINDS ALOFT. Strong winds aloft impact all ballistic projectile aiming calculations. Accurate and timely meteorological data can compensate for the problem.

WIND PROFILE. Wind profiles play a major role in ballistic wind compensations for artillery firing.

Table D-1. Weather effects from cloud ceilings.

WEATHER VALUE (FEET)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
LT 500	ATACMS	Target acquisition		
LT 600	COPPERHEAD	Target acquisition		
LT 800	SADARM	Target acquisition		
LT 1,000			ATACMS Army aircraft	Target acquisition See app E
LT 1,500			COPPERHEAD	Target acquisition
LT 3,300			SADARM	Target acquisition

Table D-2. Weather effects from reduced visibility.

WEATHER VALUE (METERS)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
LT 200	FO		NVG (PVS-5) Infrared aiming light (PAQ-4)	
LT 400			NVS (PVS-2)	
LT 500	DRAGON		FO	
LT 600			NVS (PVS-4)	
LT 1,000	TOW		DRAGON thermal sight (TAS-5)	
LT 1,200			NVS (TVS-2, TVS-5)	
LT 2,000			NVS (TVS-4)	
LT 3,000			TOW thermal sight (UAS-12) Handheld thermal viewer (PAS-7) Thermal night observing device (UAS-11)	
LT 3,500			AFO	

Table D-3. Weather effects from surface wind.

WEATHER VALUE (KNOTS)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
GT 7			GSR	Increased noise
GT 20	GSR	Increased noise	Communications antennas	Setting up
GT 25			Personnel	
GT 30	Meteorological processor (GMD-1)	Inhibits balloon launch	Meteorological data system (TMQ-31) Meteorological measuring set (TMQ-38)	
GT 35	Artillery detection radar (TPQ-36)	Stow antenna	155-mm how	
GT 40	Personnel			
GT 50	Communications antennas	Setting up		

Table D-4. Weather effects from temperature.

WEATHER VALUE (°F/°C)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
LT -25/-32	TOW DRAGON Rocket launcher (M202A1) Handheld thermal viewer (PAS-7) Dry cell battery Personnel	 Only 20% effective	Generators	wo arctic kit
LT -20/-28			NVS (PVS-4) Maintenance	wo low temp adapter 5 times longer
LT 0/-18			Wheeled vehicles Dry cell battery	wo winter kit Only 40% effective
LT 20/-6			Thermal night observation device (UAS-11) Platoon early warning system (TRS-2) DRAGON	wo arctic kit wo BA3090 battery Need low temp adapter
LT 32/0			NVG (PVS-5) Personnel Small arms and machine guns	wo arctic kit See app L for wind-chill Effective-ness reduced
GT 85/29			Personnel	See app L for temp/ humidity index
GT 95/35	Personnel	See app L for water consumption	Dry cell battery	Will not hold charge

Table D-4. Weather effects from temperature (continued).

WEATHER VALUE (°F/°C)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
GT 125/52	All NVS Generators 155-mm how (M198) ammunition 105-mm how TACFIRE Laser infrared observation set (GVS-5) LANCE WP artillery rounds	Become unstable		

Table D-5. Weather effects from precipitation.

WEATHER CONDITION	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
Light rain or snow			Mortar operations Wheeled vehicles	Sight glass fogs up
Moderate rain or snow	Wheeled vehicles		LOS communications Personnel movement Target acquisition Platoon warning system (TRS-2) GSR Acoustic systems Equipment storage Laser systems	
Heavy rain or snow	Mortar operations Personnel movement Laser systems LOS communications Target acquisition			
Thunder-storm/ lightning			Ammunition Refueling Communications Equipment storage	Safety Interference
Light freezing rain			Personnel Wheeled vehicles	
Moderate freezing rain	Personnel Wheeled vehicles			
SNOW DEPTH (INCHES)				
GT 3			Personnel movement	
GT 6	Personnel movement		20-mm and 40-mm ammunition Wheeled vehicles	
GT 12	Wheeled vehicles			
GT 20			Tracked vehicles	
GT 30	Tracked vehicles			